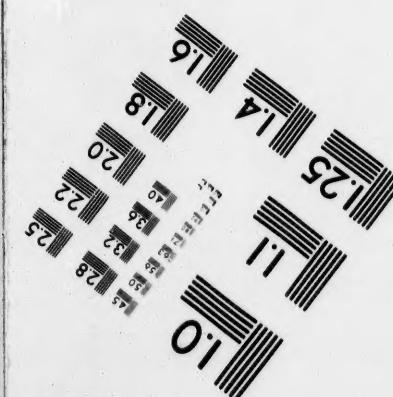


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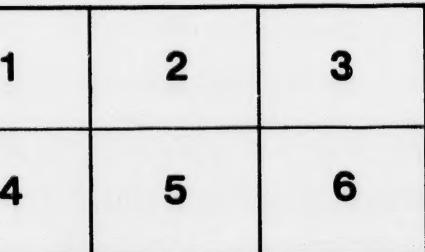
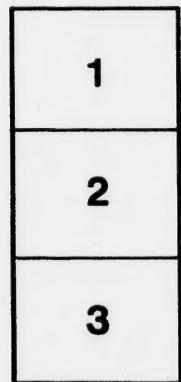
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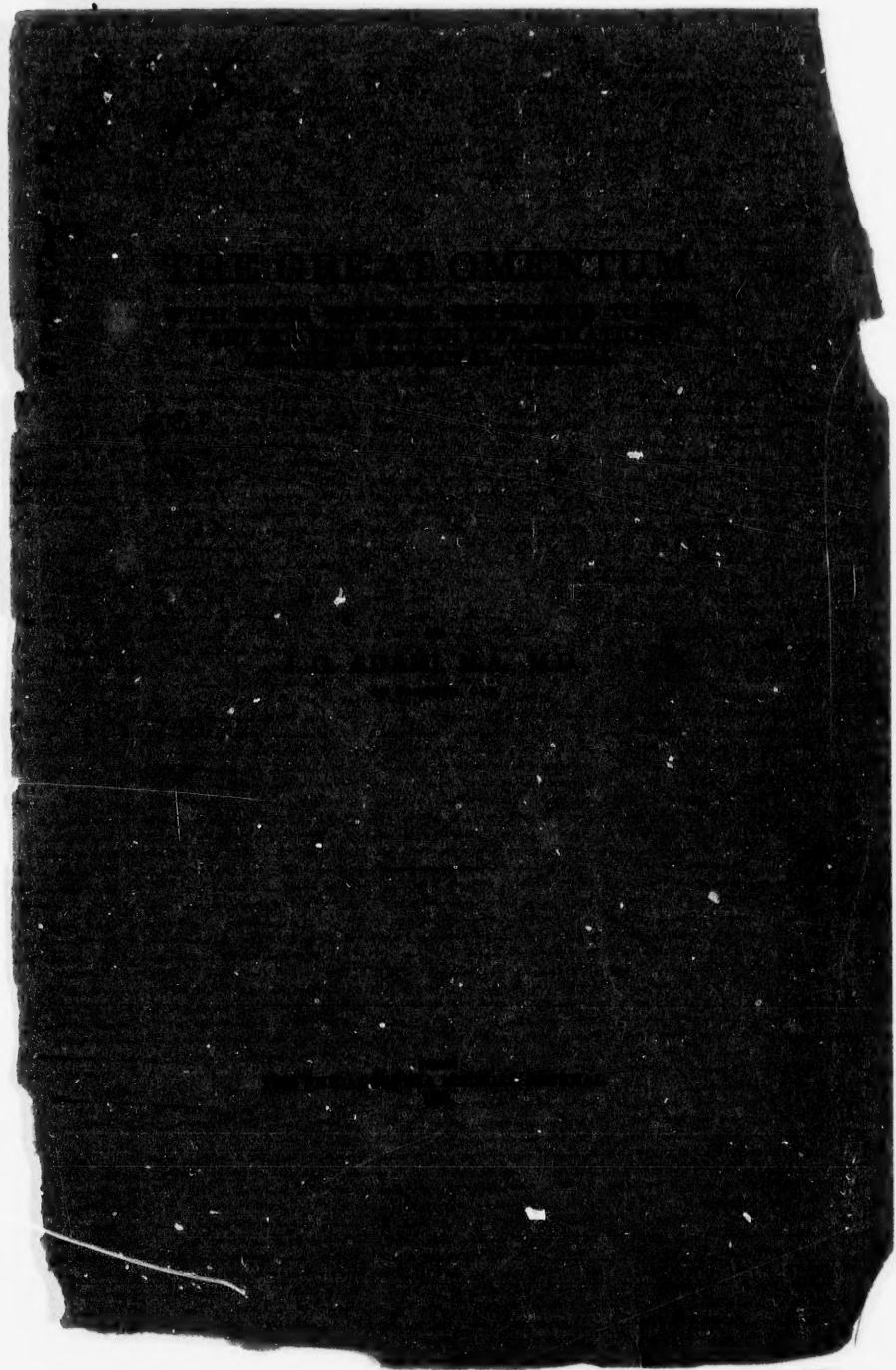
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6 Aug. 1864 P. 261.

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## THE GREAT OMENTUM. With More Especial Reference to the Part Played by It in Inflammations of the Abdominal Visera.<sup>1</sup>

By J. G. ADAMI, M.A., M.D.,

~~of [redacted]~~

Professor of Pathology McGill University, Montreal.

WHEN so much has been written upon other organs, it is remarkable how little attention has been paid to the great omentum. There is a scanty literature upon pathological conditions of the organ—if organ it may be termed—mainly upon cysts and tumors of the same. This, with a few papers upon its development, and still fewer upon sundry points in its histology and upon its surgery, and until the last few months practically none upon its physiology, represents all that has been written during the century. Evidently, according to the *Index Medicus*, during the last ten years, when medical scribbling has been at its height, not two papers per annum have been published, of which the main subject has been some one or other condition of this viscus. And yet this is the ominous organ of the augurs, every aspect of which, studied by them, was found full of fate. The older priestly comparative anatomist is long past and gone, and now no modern comparative anatomist so poor as to do the omentum reverence.

Thus, if, following the time-honored custom, one wishes to lead gently up to his subject—to introduce it

<sup>1</sup> Being the main body of a paper read before the Toronto Pathological Society, December 29, 1897.

in a respectful manner—by referring to the observations and conclusions of those who have gone before, he finds himself confronted by the fact that here, in connection with the great omentum, there is little to be said unless he travels back through the centuries. There is no voluminous literature, no array of modern continental authorities, whose names, in length and difficulty of pronunciation, are in inverse proportion to the facts and theories they bring forward. There are, it is true, isolated observations upon the omentum, of recent date—observations of great value by Ranzier, Durham and others; but for any attempt at broad generalization upon the functions of the same we have to wander back to the seventeenth century, and beyond that to the fathers of medicine. And strangely enough, passing back to the limits of medical history, we find that old Hippocrates noted that which, as I shall have later occasion to point out, was perhaps more nearly correct than any of the observations for long centuries following. In addition to his aphorism that if the omentum protrude it necessarily mortifies and drops off, he makes a longer reference in his book "*πεζ: τοπων.*" Writing concerning exudations, he turns to one side to refer to the spleen. "In fever," says he, "the spleen becomes enlarged, increasing in size as the body becomes emaciated. Indeed, everything which causes the spleen to become enlarged consumes the body. When the body becomes emaciated, if the spleen be swollen and the great omentum attenuated at the same time as the body, then the fat which was in the omentum is dissolved, and when the organ is free from fat, the growing spleen furnishes a flux, and the omentum, which is close by, which has vessels, and those vessels empty, receives that flux."<sup>2</sup>

<sup>2</sup> *Oeuvres complètes d'Hippocrate*, Littré's edition, Paris, 1849, p. 314.

It is true that Littré and Adams and the modern commentators regard the work in which this passage occurs as almost certainly not by Hippocrates. But within the last few weeks, Spaet, in his study of a remarkable manuscript (*Anonymous Londinensis*, one of the rich horde recently unearthed in Egypt by the British Museum authorities), points out that Hippocrates clearly indulged in theoretical speculation, and that the commentators have been wrong in taking from him all the so-called philosophical writings. Hence it is not impossible that the treatise is by the physician of Cos. Whoever be the author, it is curious that he should have spoken of this flux into the omentum almost with the same breath with his discussion upon dropsy. Indeed, he appears to imply that this flux is dropsical. The wise old Malpighi, commenting upon this passage, carries the connection to its natural conclusion and makes the definite suggestion that from the omentum the flux may pass into the abdominal cavity and be a cause of dropsy. It is remarkable that, so far as I can read, no authority since has taken up the relationship between this vascularity (and delicacy) of the great omentum and the development of ascites. There is only the suggestion of a German country practitioner, one Landgraf,<sup>8</sup> who in 1870 called attention to this possible function. He gave the notes of a case of ascites associated with cardiac disease and of many months' duration, which had proved absolutely intractable to 14 tappings. Being called one day to the case, he found the abdominal distension so great and the respiratory difficulty so alarming that death appeared imminent unless the fluid were removed. He had no trocar with him and was compelled to perform paracentesis by means of a lancet and a piece of tubing. As a

<sup>8</sup> *Deutsches Archiv für klinische Medicin.*

result there developed at the incision a hernia of the great omentum of the size of a walnut. The protruding tissue, true to Hippocrates' aphorism, sloughed off, and there was no further untoward result; but within a few days the ascites came to an end, and, after one further tapping, never recurred. Landgraf makes the obvious, though it may not be absolutely logical, suggestion that the great omentum is largely responsible for the exudation of ascitic fluid. At the last moment I find that a confrère here in Toronto, Dr. J. F. W. Ross, has arrived at a similar conclusion and in his very full article upon the omentum,<sup>4</sup> he quotes Lawson Tait as holding like opinions.

But if Hippocrates may have come near to indicating one important function of the viscera, that, namely, of regulating to a greater or less extent the amount of fluid passing into (and out of) the peritoneal cavity, those who followed him held other views. We owe to Aristotle the commonly accepted opinion that it is formed of light membranes, and so placed, covering the intestines, as "to preserve the innate heat of the body." Galen accepted and expanded this view. He gives the case of a gladiator who, having lost his omentum through an abdominal wound, recovered from the injury, but thereafter felt cold in his abdomen!<sup>5</sup> So far as I can find from inquiry, this Aristotelian view remains the most commonly accepted at the present day.

With the renascence of medicine the obscurity of the omentum made it the text for numerous most wild discussions. In his "Exercitatio de Omento," Malpighi collects some of the leading theories. Thus, for example, Fabricius ab Aquapendente (well known in connection with the discovery of the circulation) held that it was the seat of those winds which so torture hypo-

<sup>4</sup> *American Journal of Obstetrics*, xxviii, 1893, No. 6.

<sup>5</sup> Galen: *De usu partium*. Frobenius' edition. T. 1, lib. 4, 1567, p. 1244.

ia of the protruded off, within a e further obvious, suggestion e for the ent I find Ross, has y full ar Tait as indicating amely, of mount of al cavity, "We owe to hat it is ering the he body." gives the omentum in the in<sup>6</sup> So far view re- sent day. ity of the wild dis- Malpighi for exam- in con- held that are hypo-

chondriae. Laurentius, Bauhinus, and others considered that it collected the humors going to the intestine or the excrementitious matters from the spleen, while Cordaeus taught that it was a second stomach or food-store from which the stomach received again the food; whence, by him, man was declared to ruminate like unto brute beasts.

Malpighi himself was cautious of attaching any function to the viscus. He was even doubtful whether to accept the vulgar opinion as to its heat-preserving properties. He was especially interested in its relationship to the storage of fat, and has not a little to say concerning the use of fat and its nature as a food. Thus he concludes that fat is important to the economy, is taken up from the intestines and stored in the great omentum and other regions for further use. In short, Malpighi represented the reaction to the wild theorizing of his immediate predecessors, and from his time onward it may be said that the theorizing has given place to agnosticism, or, rather, to indifferentism. With rare exception, no one nowadays troubles to think of the viscus.

Possibly this indifferentism is a right attitude. The great omentum varies much in size; and when an organ is very variable and at times almost absent, we are in general correct in regarding it as of relatively little use—as a disappearing and *therefore* useless structure. I think, however, that it is not quite so variable, as one is apt to regard it; very often, it is true, the coils of the small intestine are wholly exposed, and the first impression is that the omentum is inconsiderable. But it is there, and if the mass of delicate membrane be unravelled it is most often found to be quite extensive.

In 150 consecutive autopsies I found it—

Coiled under the transverse colon,	10 cases.
Coiled under the stomach,	1 case.

Coiled in front of and above the transverse colon,	5 cases.
Coiled and lying over the transverse colon to the left,	2 "
Passing up over the liver, without adhesions,	2 "
Passing up under the liver,	1 case.

Studying the organ in man, we are at a disadvantage, for most of the human subjects of the pathologist and anatomist have been bed-ridden for some little time, or may have suffered from disease of the abdominal cavity. With long continuance in the supine position, it is more than probable that this floating membrane becomes liable to assume relationships which would rarely be found in those suddenly killed. My observations tally with McLeod's suggestion that when the omentum is coiled up, the subject, in most cases, has been upon his back for some little time.<sup>6</sup>

On the other hand, when the omentum seems particularly voluminous, completely covering over the whole anterior aspect of the lower abdomen, I have found that there may again be deception. Thus, only on Sunday last, at an autopsy upon an individual presenting cerebral disturbance with no abdominal lesion, the edge of the membrane passed well beyond the pelvic brim into the pelvis; but here the stomach was large and full, the transverse colon crossed a good inch below the umbilicus, and as a consequence the increased size of the omentum was only apparent.

Granting all this, we must, however, grant also that there are variations—great variations. It can be most

<sup>6</sup> Durham points out that in rabbits and guinea-pigs in which peritonitis has been induced, the omentum becomes rolled and folded up, and he notes that he observed a similar condition in a young child. While such rolling up does occur in association with acute peritonitis, my notes show that it is far from being a constant condition. (Durham, p. 9, *Journal of Pathology*, iv, 1897, p. 355.)

voluminous; it is also stated to have been found completely absent. Personally I have not come across this last condition. In the above-mentioned 150 autopsies, there were two subjects, both old men, in which the omentum had a shrunken appearance and was only an inch and a half across, while in a third case, a phthisical patient of 26 years, it was represented by three tags of delicate reticulated membrane, one 6 x 6 cm. (2.25 x 2.25 inches), arising from the postero-inferior aspect of the middle region of the transverse colon, one 7 x 6 cm., from the antero-inferior aspect of the same region, while a third, 6 x 14 cm., passed up from the left extremity of the transverse colon to beneath the left lobe of the liver.

In the lower animals it is much more regular in size and position, and there can be no question of its being a disappearing organ. Indeed, the contrast between the condition in man and brute might also seem to give support to the protective-apron theory and to the further theory that the assumption of clothes by man is at last beginning to tell upon the internal organs—to lead to the transmission of atrophy of the internal apron in consequence of disuse!

But were the "apron" theory valid, we should expect to find an inverse relationship between the development of the heat-retaining panniculus adiposus and the development of the omentum. This we fail to find. When there is a thin abdominal wall, there, as a rule, the omentum is thin and with little fat. The apron theory must be put aside.<sup>7</sup>

What, then, can we say concerning it and its function or functions? It seems to me that there is one feature about the great omentum which is the all-important

<sup>7</sup> That is, in its usual presentation. But it is possible that when, through cold, the vessels of the abdominal parietes become contracted and the splanchnic vessels distended and congested, the great omental vessels share in this congestion, and that thus a warmed and congested membrane is interposed between the cooled parietes and the intestines.

feature histologically and physiologically, and that is the main characteristic of its structure. It is true that it is a membrane, or, more correctly, a double membrane folded upon itself, the two layers forming the anterior and posterior serous investments of the stomach, passing downwards to form the anterior portion of the omentum, and then doubling upon themselves to form the posterior aspect and travel upward to enclose the transverse colon. But these membranes fused together

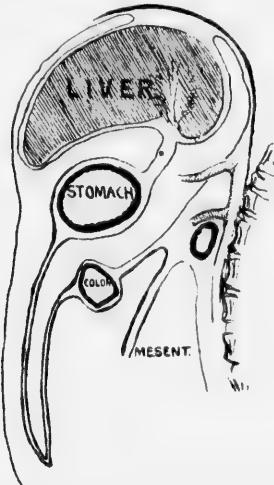


Fig. 1.—Diagrammatic representation of the relationships of the great omentum. (Modified from Lockwood.)

are nothing but endothelial and connective tissue-elements. What is characteristic of all great omenta, however delicate, or however loaded with fat, is their remarkable vascularity. The vascular supply is altogether in excess of the needs of the membrane itself; and if the great omentum has any function, that func-

tion must be sought for through the vascular system. Without exaggeration, the great omentum may be regarded as a mechanism for supporting and keeping in position a rich arborization of delicate vessels separated by as slight a cell-layer as possible from the peritoneal cavity. As might be expected, with the branching of the main vessels, the finest and most delicate vessels are largely collected toward the periphery and along the free border of the omentum. Here it is, therefore, that the most prompt reaction is liable to occur.

It is from this point, then, that we must start if we are to appreciate the part played by the omentum in the economy. I have already hinted that it is from the abundant network of delicate vessels that there may be abundant flow of fluid into the abdominal cavity. Similarly the rich system of contained lymph-spaces and lymphatic vessels, and, indeed, of blood-capillaries, may be the means of rapid absorption of fluid from the same cavity.

Much as I should like this evening to enter into the more physiological aspects of the omental functions, I must desist; for my personal observations along the lines just indicated are not as yet complete or in a proper state for bringing before you.<sup>8</sup> What I wish to bring before you to-night is the evidence we possess concerning the activity of these omental vessels in conditions which are constantly being brought before our eyes, but which, it is worth noting, would appear not to have been thought worth noting. I refer to their reaction in localized inflammations of the abdominal cavity,

<sup>8</sup> Durham (*loc. cit.*) records some most interesting observations upon the part played by the leukocytes in relation to the surface of the great omentum, but he does not indicate with full satisfaction the extent of passage of fluid, leukocytes, or foreign particles into or out of the viscera. Similarly, Adler and Meltzer (*Journal of Experimental Medicine*, 1, 1896, p. 482) discuss very fully many important points in connection with the absorption of fluid from the peritoneal cavity, but their observations stop short of determining the exact regions of passage of fluid into the lymph-spaces of the peritoneal walls.

and the results of that reaction in the shape of omental adhesions. I have hunted up all the literature at my disposal. Every one refers to these adhesions, but no one would seem to have thought it worth while to tabulate them or to record their frequency. I cannot pretend that my own observations are as full as I should like. Nevertheless, in 150 consecutive autopsies, in which the abdomen was examined, I possess brief notes upon the more obvious conditions observed, and now, reviewing my notes, I am surprised to find how very common are these attachments, and am impressed by the evidence afforded of the rapidity with which the omentum appears to apply itself to an inflamed area, becoming sympathetically the seat of inflammation, becoming adherent by plastic, and later by fibroid, adhesions. Few, I fancy, realize the rapidity of the process. So delicate are the fine vessels, so small is the layer separating them from the peritoneal cavity, that they readily respond to any irritant. Probably, as Durham's observations would seem to show, the rapidity of the adhesive process is further and largely associated with the remarkable adhesiveness of leukocytes to the omentum in cases of inflammation, and the local accumulation of leukocytes upon the omental surface is the immediate precursor of the fibrinous cementing together of inflamed organ and overlying membrane.

The autopsies referred to were upon the subjects in the post-mortem theater at the Royal Victoria Hospital—a general hospital, open to all cases of disease save the acute exanthemata, at all ages.<sup>9</sup>

ADHESIONS TO THE ABDOMINAL WALLS.—As might be expected, there were several (8) instances of generalized adhesions, either plastic and acute, or fibroid and chronic, in cases of recent or old generalized peritonitis,

<sup>9</sup> The pathological diagnoses of these cases are to be found in detail in the annual reports of the Hospital for the years 1894 and 1895.

and several of localized adhesions along the sites of operation-wounds. Many of these will be referred to later; 6 were either in the middle line below the umbilicus or in the right inguinal region (for appendicitis), where the adhesion was in the right flank following incision into a pericecal abscess. In the 2 cases there were old adhesions of the edge of the viscus along the pubic crest anteriorly. Both of these were cases of generalized tuberclosis, and in both, although there were subserous tubercles of the ileum in the pubic (or suprapubic) region, there were no adhesions of the under aspect to the intestines. There were 4 instances of old adhesions in the left flank, 2 in the right flank over the ascending colon, and 2 to the parietal peritoneum, covering the under surface of the ribs on the right side. All these, in the absence of operation-wounds or definite local disturbance, may have been indications of a previous general peritonitis. There were 3 examples of incarceration in an umbilical hernia, in one of which there had been "reduction en bloc," and in 1 case there was attachment to a secondary cancerous nodule at the navel. In 1 case, also, a large portion of the right border passed into the right inguinal canal, and was adherent over the testis. In a remarkable case of neglected gangrenous appendicitis, with suppurative thrombosis of the mesenteric vessels and retroperitoneal abscess, a large tag of the right border passed down between the intestinal coils to the hind wall of the abdomen, where it was adherent to the right of the root of the mesentery, near the duodenum. Upon separating the recent adhesions, abundant pus welled out from a retroperitoneal abscess. Evidently this tag had prevented general peritonitis. In another case the right border passed down into the pelvis and was adherent to the pelvic wall, forming the roof of a localized pelvic abscess. Here, again, the

generalization of a suppurative process was arrested by this means. I shall speak of the walling in of peri-typhilitic abscesses in connection with the appendix.

Of equal interest are the localized adhesions discovered in connection with the different abdominal viscera. There were, as might be expected, numerous examples of attachment to the intestines.

**STOMACH.**—In a case of gastric ulcer, with perforation, plastic adhesions of the omentum doubled upwards upon itself occurred over the area where the large ulcer (upon the anterior aspect of the organ) had been brought together by a Lembert's suture. The operation had taken place nine hours and a half before death.

**SMALL INTESTINES.**—In 2 cases of general peritonitis, one acute, one chronic, there were numerous adhesions. A case of traumatic rupture of the jejunum near the duodenum, in which Murphy's button was applied without success, showed the right border of the omentum adherent by plastic exudations over the seat of junction; and in another unsuccessful Murphy button case, where some four inches of the ileum close to the valve had been removed by Dr. James Bell for sub-mucous sarcoma, there were similar adhesions. (In both these cases the intestines had become necrosed and perforated at the mesenteric attachment.) Another case, from a man, aged 24, presented a condition which I can only regard as an old healed intussusception. The upper half of the ileum was somewhat distended (11.5 cm. in diameter as compared with 8 cm. below), the obstruction being due to the presence of an annular constriction admitting a cone 6.3 cm. in circumference. The mucosa over this ring showed no cicatrix, but externally there were evidences of old inflammation in the shape of small longitudinal bands running from above the constriction to below it, while a delicate band of the right border of the omentum was adherent to the intestinal wall in the immediate neighborhood.

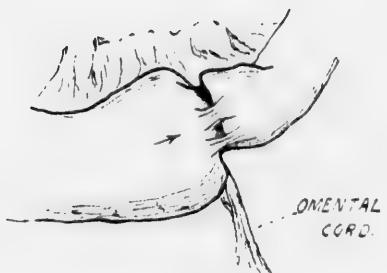


Fig. 2.

APPENDIX.—In 4 cases, all acute, plastic adhesions were found forming portions of the retaining walls around the abscess in perforative appendicitis. In one case already recorded by Dr. C. F. Martin, there was old perityphlitis without marked disturbance of the appendix, and here again the right border of the omentum was adherent and had helped to cause the cicatricial and banded obstruction of the ileum, which eventually led to peritonitis and death.<sup>10</sup>

COLON.—I find 2 examples of adhesion to the sigmoid flexure—one a very interesting case of huge idiopathic or congenital dilatation, the adhesion being to the lower end of the flexure, where the dilatation gave place to constriction, but apparently was not the primary cause of the same.<sup>11</sup>

RECTUM.—Two examples are recorded of adhesions to the rectum. Case 1. Plastic, to the first part anteriorly, after removal by Dr. W. Gardner of a ovarian cyst and encysted pelvic abscess. 2. Chronic, in a case of pernicious anemia, with arrested tuberculous complications, old apical tuberculosis, perihepatitis, and other evidences of generalized peritonitis, possibly tuberculous.

<sup>10</sup> *Montreal Medical Jour.*, xxiv, 1896-6, p. 558.

<sup>11</sup> C. F. Martin, *ibid.*, xxv, 1896-7, p. 697.

It is, however, when we come to the other abdominal viscera that we meet with some of the most remarkable instances of this liability of the omentum to form local attachments over inflamed areas.

**LIVER.**—Four cases. 1. One was a case of atrophic cirrhosis, with ascites and sero-fibrinous peritonitis after repeated tappings, in which it may be that the accumulation of serum in the abdominal cavity had floated the omentum upward. 2. A case of (?) old calcified hydatid cyst of the right lobe communicating with the adherent hepatic flexure of the colon. In this region the omentum was also adherent. 3. Multiple pyemic abscesses of the liver. On the under surface of the right lobe, where the process was most extensive, bulging and almost bursting through Glisson's capsule, the omentum formed, as it were, a plaster over the region. 4. In the fourth case there were similarly pyemic abscesses of the liver secondary to pericecal abscess, with suppurative thrombosis of the mesenteric vessels. A case of subacute ulcerative cholecystitis, with eventual perforation, showed also chronic omental adhesions.

**OVARY.**—In one case I have recorded adhesions to the chronically inflamed left ovary.

**UTERUS.**—In one case there were several adhesions to the fundus (a case of retained placenta, puerperal metritis, and septicemia), while in 2 not a little remarkable instances of hysterectomy, with death some few days later, the omentum passed downwards in between the coils of the small intestine to the bottom of the pelvis, and formed adhesions over the stump of the uterus. In one of these it was the right border, in the other the central portion of the omentum that formed a broad, taut band, running downward to be attached. The resulting disturbance of the bowels, had these patients survived, can only be imagined.

I trust that I have not tired you with this detailed account of omental adhesions. As already stated, I have entered thus fully into the subject because I know of no similar record; 150 autopsies are not a great number from which to glean information, but are the reverse. My set of cases is devoid of examples of most of the conditions of omental disease to which attention has been called by previous writers. There were no examples of penetrating wounds of the abdomen plugged by the membrane to which McLeod has more especially drawn attention,<sup>12</sup> or of intestinal rents or perforations obtaining primary closure by similar means, which Gross was one of the first authorities to especially note.<sup>13</sup> Mine are ordinary consecutive and unselected cases; but as such, the fact that the omentum may gain attachment to every viscous lying in the abdominal cavity, and does this very frequently, is brought into strong relief.<sup>14</sup> It may pass upward and become attached to the stomach or liver, may journey to the right and form adhesions over the cecum and ascending colon in the neighborhood of the appendix, or backward to act as a plaster over a retroperitoneal abscess, and, what is still more remarkable, its edge may wander down into the pelvis and become fastened to the rectum, the ovary, or even to the stump of the uterus after hysterectomy. The number of autopsies is not great; but notwithstanding, we find this very large proportion of examples of old and recent abdominal inflammation, with the omentum forming adhesions in consequence.

At first sight it looks almost as though the viscous were

<sup>12</sup> Kenneth McLeod. *Edinburgh Med. Jour.*, xxiii, 1877, p. 1.

<sup>13</sup> Gross: "System of Surgery," 8th edition, p. 664.

<sup>14</sup> I have left the spleen out of this enumeration, because, while I have an occasional note relative to omental adhesions of this organ, I recognize that our observations are far from complete, in consequence of the organ being pulled forward for bacteriological purposes before its relationship *in situ* could be properly examined. Strictly speaking, every splenic adhesion is an omental adhesion, because the organ is developed within the omentum.

endowed with powers of active locomotion, and so soon as any localized injury and inflammation manifested itself, forthwith some portion of its border, more especially of its right border, formed a feeler, made its way to the affected area, and within a little time became adherent over it, thus helping to prevent the spread of the inflammation. It almost looks, I say, judging from the facts here thus far recorded, as though this were the case.

But there are other considerations to be brought forward before passing judgment. Although I have been able to adduce so many cases of localized abdominal inflammation, followed by omental adhesions, there were numerous examples in our 150 cases in which no such adhesions had been found, although similar lesions of various organs had been present. Naturally a table of these conditions would be much shorter, for it could only include acute and recent cases of local inflammation, in which the local lesion was progressing. Previous local disease without adhesions, followed by recovery, leaves little or no record. Add to this that it is much more difficult to wade through our somewhat voluminous post-mortem records and note every case in which there has been superficial inflammation of abdominal organs. I have, however, noted in them two cases of cancer of the stomach, with perforation and perforative peritonitis; two cases of extensive cancer of the stomach and cancerous peritonitis (without perforation); two cases of very extensive tuberculous peritonitis, all without signs of adhesion anywhere; a similar case of perforated tuberculous ulceration of the small intestine and perforative peritonitis, and at least two cases of well-marked subserous intestinal tuberculosis, without noticeable reactions of any kind in the omentum and neighboring parts. In a case of enteric fever with perforative peritonitis, as is the general rule, there

was not a sign of plastic exudation or adhesion anywhere. In two cases of inguinal hernia the omentum appeared indifferent and unaffected; in one there was well-marked localized subacute peritonitis after incomplete reduction of the hernia; in the others the great omentum did not extend below the umbilicus, although there was plastic exudation around the operation-wound. A case of chronic cholecystitis, leading to empyema of the gall-bladder and perforative peritonitis (again a Murphy button case), showed neither old nor recent adhesions of the omentum. Doubtless I might multiply examples. I have, however, given you enough to show that the omentum does not by any means necessarily send out processes to cover over and adhere to inflamed abdominal areas. It is not merely a question of the quality of the inflammation that determines the adhesions. Here are at least a few examples in which plastic and adhesive exudation might easily have been set up—only the omentum did not manage to find its way to the injured area, and as a consequence no adhesions developed. There is no such protective sending out or wandering or chemiotaxis of portions of the omentum to cover over and shield areas of injury and inflammation.

It cannot be urged that the omentum broods like a beneficent Providence over the abdominal contents, descending to minister help where it is needed and to arrest the spread of harmful inflammation. For in the first place, as I have just remarked, there are inflammations and inflammations—where there is very acute disturbance, or where, again, as in typhoid and the later stages of exhausting illness, the reactive power of the organism has sunk to a very low ebb, a serous rather than a leukocytic and fibrinous exudation obtains; and where this is the case there can be no adhesions, even though the omentum be lying over the area of injury.

And in the second place, while in many cases it appears as though the apposition and adhesion of the omentum had been of the greatest benefit in walling in and localizing an acute inflammatory process, in others, the intervention of the membrane, however great its temporary value, results in serious inconvenience, not to say profound injury. When (to quote one of the examples already given) the omentum passes as a broad band deeply between the coils of the small intestine, to gain an attachment to the stump of the removed uterus or other pelvic organ, it must be admitted that there is serious traction upon and disturbance of the movement of the transverse colon, with grave danger of obstruction to the small intestines. Indeed, Lechtenstern had collected in the seventies no less than 29 cases of internal hernia of the intestines due to omental bands. To quote from Professor Welch's admirable address upon "Adaptation in Pathological Processes," delivered in 1897 at Washington: "We see here, as everywhere, that nature is neither kind nor cruel, but simply obedient to law, and therefore consistent."<sup>15</sup> In the great omentum we have a singularly delicate vascular organ capable of reacting very rapidly to irritation. That is all that it is safe to say. How rapidly it can react is shown by the case already mentioned, in which, in a moribund girl, dying 9½ hours after suture of the perforated stomach-wall, there was already plastic adhesion of the organ over the sutured area. That it becomes adherent to organs so distant from the position in which it is usually found, as are, for example, the anterior aspect of the stomach, the right lobe of the liver, and the cervical portion of the uterus, is an indication of what is scarcely sufficiently realized, namely, that this delicate membrane must constantly

<sup>15</sup> Trans. Congress Am. Physicians and Surgeons, iv, 1897, p. 291.

be shifting its position, or, at the least, must, in cases of abdominal disturbance, be peculiarly liable to roll about. We think of it as normally covering over the coils of the small intestine, more especially above and to the left, and as very rarely passing lower than the pubic crest. Yet it must roll upward and descend downward, and in these gyrations it is that, being applied to an inflamed area, its vessels become rapidly congested, serum and leukocytes exude, and the first stage of adhesion is set up.



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